Total hip replacement using the McKee-Farrar prosthesis

In rheumatoid arthritis, Still's disease, and ankylosing spondylitis

G. P. ARDEN, A. R. TAYLOR*, AND B. M. ANSELL

Heatherwood Hospital and the M.R.C. Rheumatism Research Unit, Canadian Red Cross Memorial Hospital, Taplow, Maidenhead, Berks.

Severe destructive change in the hip joint is not infrequent in patients with long-standing rheumatoid arthritis and Still's disease. In ankylosing spondylitis, whether primary or secondary to other diseases such as Still's disease, there may be a bony fusion or destruction. Various types of hip arthroplasty have been carried out in the last 30 years (Smith-Petersen, 1939; Charnley, 1961). The earlier prostheses, such as those of Judet and Judet (1950) and Austin Moore (1952), produced encouraging results. The Austin Moore prosthesis and that of Thompson were associated with loosening of the stem and migration, the latter especially in rheumatoid arthritis (Moore, 1952; Thompson, 1952). The Judet prosthesis also suffered from structural failure. The mould or cup arthroplasty is used in many centres but is not entirely satisfactory because of further wear and migration.

The total hip replacements of McKee-Farrar and of Charnley have produced better early results. In this type of operation both surfaces of the joint are replaced and cement is used to obtain firm fixation of the prosthesis to the bone.

The purpose of this paper is to present the results of McKee-Farrar arthroplasty (McKee and Watson-Farrar, 1966) in patients suffering from rheumatoid arthritis, Still's disease, and ankylosing spondylitis, and to compare these with results obtained in degenerative joint disease of the hip.

Material and methods

Patients are referred to the combined rheumatological and orthopaedic clinic for surgical consideration when pain is persistently present at rest or seriously interferes with sleep, or where there is severe restriction of movement. Due attention is also paid to the patient's attitude to previous therapy and willingness to co-operate in a prolonged programme.

Over a 3-year period from November, 1965, there has been a total of 33 patients with rheumatoid arthritis. As might be expected the majority were women. Nine had bilateral operations giving a total of 42 hip operations. The mean age at the time of operation was 54 years, and the mean duration of the disease process $8\frac{1}{2}$ years. Thirteen were receiving corticosteroid therapy.

There were ten patients with Still's disease; five of these had bilateral surgery giving a total of fifteen hips, the youngest patient being 18 years old.

There were five patients with ankylosing spondylitis, two of whom had previously suffered from Still's disease. In four the operation was performed on both sides giving a total of nine hips.

Thus 66 operations have been carried out in cases of inflammatory disease. These patients have been followed-up in the combined clinic to date, and in this paper the results are compared with those in 79 patients with osteoarthritis in whom ninety operations have been performed (Table I).

Table I *Number of operative procedures*

<i>Disease</i>	<i>No. of patients</i>	<i>No. of bilateral cases</i>	<i>No. of hips</i>
Rheumatoid arthritis	33	9	42
Still's disease	10	5	15
Ankylosing spondylitis	5	4	9
Total inflammatory disease	48	18	66
Osteoarthritis	79	11	90
Grand total	127	29	156

Preoperative management

Before surgery the patient receives physiotherapy and is taught how to use the crutches or sticks which will be necessary during the postoperative convalescence. It is particularly important that, in patients with impaired

*Correspondence to A. R. Taylor, F.R.C.S., Rheumatology Unit, Stoke Mandeville Hospital, Aylesbury, Bucks.

hand function, adequate preoperative arrangements are made to overcome their disability in the use of walking aids. Increased corticosteroids, to cover the immediate operative period, are given to those patients already receiving this medication, and to those who have stopped it within the last year.

Operative technique

Hypotensive anaesthesia is used. In the majority of cases we have used the lateral approach, turning up the greater trochanter to expose the hip. This approach gives an excellent view particularly in difficult cases, *i.e.* protrusio acetabuli and ankylosed hips.

The capsule is incised and the hip dislocated by flexion, adduction, and external rotation. Care should be taken at this stage, as the bone is often rarefied and there is danger of fracture. The line of the femoral prosthesis is marked, and the head of the femur removed with a Gigli saw. Cartilage is removed from the acetabulum and the cavity reamed. Then four or five drill holes, $\frac{1}{2}$ inch deep and $\frac{1}{2}$ inch wide are made into the acetabular floor, preferably with one into the ischial spine.

Cement is firmly pushed into the cleared acetabulum and the cup is inserted and forced home with the cup impactor until the cement sets (average time 8 minutes). The direction handles on the impactor ensure the correct positioning of the cup.

The neck and shaft of the upper femur are now reamed

out, taking care not to go through the side of the shaft. The femoral prosthesis is then inserted without cement and the hip is reduced and tested for movement. If reduction is difficult more of the femoral neck may have to be removed. If movements are limited, psoas or adductor tenotomy may be required.

When the reduction is satisfactory the hip is again dislocated, and the femoral prosthesis is removed and then cemented back into place.

The hip is reduced, the trochanter held back in place with staples and wire, a suction drain is inserted, and the wound closed (the Figure shows a radiograph at the end of the second operative procedure). A firm pressure bandage is then applied and the patient is returned to the ward with 6 lb. skin traction to the affected leg. On average these patients require one pint of blood during the operation.

Two sizes of cup have been used; the standard is satisfactory in the majority but cases with a shallow acetabulum or small pelvis require the smaller cup. It is felt important to fix the cup as deeply as possible. Screws, as described by McKee and Watson-Farrar (1966), have been used less and less.

After treatment

The suction drain is removed in 24 to 36 hours. Static leg exercises are given for the first week. A check radiograph is taken. After one week the traction is removed and the patient gets up and sits in a chair. Provided the wound is

FIGURE Radiograph of the hips in a case of ankylosing spondylitis after bilateral McKee-Farrar arthroplasty. On the left side radio-opaque cement has been used throughout and can be seen to fill all the drill holes made into the acetabulum. A secure anchorage is thus obtained for the cup.

satisfactory the patient begins partial weight-bearing with crutches at 10 days. One month postoperatively, if the patient has made satisfactory progress, he may be able to walk without aids. However, in some of the patients suffering from rheumatoid arthritis and Still's disease, with knee, ankle, and foot involvement, it has been necessary to continue with crutches for a longer period. Exercises to regain hip movements are continued, hydrotherapy being particularly valuable.

Complications

These may be divided into early and late. Early complications include wound infection, deep vein thrombosis, and pulmonary embolism. Infection is particularly troublesome in the rheumatoid arthritis group; superficial infection occurred in twelve cases (28.6 per cent.) whereas its incidence in osteoarthritis was 11.1 per cent. In all cases treatment with antibiotics was successful and all healed satisfactorily (Table II). The incidence of superficial infection in rheumatoid arthritis is probably artificially high and undoubtedly includes some cases of simple superficial haematoma which became secondarily infected.

Deep vein thrombosis on the other hand was relatively uncommon in rheumatoid arthritis (4.75 per cent.) compared with osteoarthritis (7.7 per cent.) (Table II). This difference probably reflects the difference in the average age of the two groups, that for osteoarthritis being higher than that for rheumatoid disease.

Deep infection has been the most serious problem: rheumatoid arthritis three (7.1 per cent.), osteoarthritis two (2.2 per cent.), ankylosing spondylitis and Still's disease nil. In three cases, one of rheumatoid arthritis and two of osteoarthritis, it was necessary to remove the prosthesis and cement, leaving a pseudarthrosis, before healing was obtained.

The only serious late complication has been loosening of the cup (Table III). Of the three such cases that occurred in the rheumatoid arthritis group, two were converted to pseudarthrosis and the third had the prosthesis replaced. A similar percentage of cup loosening was encountered in the patients with osteoarthritis (eight out of 91): three of these were converted to pseudarthrosis, and in five either the cup was re-cemented or a totally new

prosthesis was inserted. This complication was not encountered in the small group with Still's disease or ankylosing spondylitis.

Table III Late complications (loosening of the cup)

Disease	No. of cases	Treatment	
		Conversion to pseudarthrosis	Reinsertion of new prosthesis or recementing of cup
Rheumatoid arthritis	3	2	1
Still's disease	0	—	—
Ankylosing spondylitis	0	—	—
Osteoarthritis	8	3	5

Results

Follow-up has been carried out at a combined clinic, the patients usually being seen at 6-monthly intervals. Those reviewed in this report have been followed up from 6 months to 3 years. The important points recorded have been absence of pain, range of movement, ability to walk, and the patient's own assessment. The results have been classified as excellent, good, fair, or poor, according to the range of flexion at the hip and the presence of pain. Excellent indicated 90° of flexion or more with no pain: good, 60-90° of flexion with an occasional ache; fair, 30-60° of flexion and no pain, or 60° of flexion or more with moderate or occasional pain; poor, the remainder.

The results in the rheumatoid and osteoarthritis groups are similar, 73.8 per cent. in the former and 79.5 per cent. in the latter being classified as good or excellent. In all groups it was noticeable that the patient's own assessment of the operation was better

Table II Early complications

Disease		Complications			
		Infection		Deep vein thrombosis	Pulmonary embolism
		Superficial	Deep		
Rheumatoid arthritis	No. Percentage	12 28.6	3 7.1	2 4.75	0 —
Still's disease	No. Percentage	2 13.3	0 —	0 —	0 —
Ankylosing spondylitis	No. Percentage	0 —	0 —	0 —	0 —
Osteoarthritis	No. Percentage	10 11.1	2 2.2	7 7.7	5 5.5

Table IV Overall results (per cent.)

Disease	Results				
	Excellent	Good	Fair	Poor	Revisions
Rheumatoid arthritis	58·0	15·8	15·8	Nil	10·4
Still's disease	57·2	14·3	28·5	Nil	Nil
Ankylosing spondylitis	28·5	43·0	28·5	Nil	Nil
Osteoarthritis	46·0	33·5	6·0	3·0	10·0

than our clinical assessment; 91 per cent. of all patients, excluding those that needed revision, rated their operation as excellent or good.

The results in ankylosing spondylitis were somewhat disappointing regarding the range of movement obtained (Table IV). It should be remembered, however, that many of these patients had either fused hips or only minimal movement preoperatively, so that although the range of movement was not quite as good as in some of the other patients, the increase was of great benefit especially in those with completely rigid thoracolumbar spines.

Discussion

The main indications for total hip replacement have been pain, limitation of movement, and radiological evidence of joint destruction, with or without collapse of the femoral head or protrusio acetabuli. Gross porosis, high erythrocyte sedimentation rate, and corticosteroid therapy were not considered contraindications to surgery. Some cases in which gross porosis was present at operation have subsequently shown increased bone density; this improvement is thought to be a response to function. Severe generalized disease with multiple joint involvement was also not considered a contraindication, as reconstruction of hips, knees, and feet is now not an impossible goal. If multiple bilateral procedures will improve the function of the patient, to allow him to lead a normal life, then surgery should be considered. One such patient aged 45 years had lead a wheelchair existence for 3 years because of multiple joint involvement. McKee-Farrar arthroplasty of one hip and total replacement of both knees were carried out and the patient can now walk and is seeking employment. The only real contraindication to surgery is lack of motivation in an

individual patient. Full co-operation, especially postoperatively, is essential; if there is no desire for surgery then the results are not likely to be good.

The operative procedure carried out was similar to that described by McKee and Watson-Farrar (1966). The only variation was in the exposure, some having a lateral approach, where the greater trochanter was osteotomosed, being held back in place with wire and staples at the end of the procedure.

It is felt that the most important point is the deep seating of the cup; this should be completely covered by the acetabulum wherever possible. To obtain this ideal a small cup has been used more and more. Screws in the acetabulum, as described by McKee and Farrar, have thus become unnecessary in the majority. Our only disappointment with this operation has been loosening of the cup, and in each case where this occurred the cup had not been fully covered by the acetabulum.

Summary

In patients suffering from rheumatoid arthritis, Still's disease, or ankylosing spondylitis, replacement arthroplasty of the hip is considered when there is gross loss of movement with pain associated with marked destructive radiological change.

A total of 66 hips affected by rheumatoid arthritis, fifteen by Still's disease, and nine by ankylosing spondylitis has been operated upon, together with ninety hips affected by osteoarthritis. These patients have been followed-up for between 6 months and 3 years, and the results are good or excellent in over three-quarters of them.

The most serious complication has been deep infection and cup loosening. It is felt that this latter complication may be largely prevented by deep seating of the cup.

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RÉSUMÉ

Le remplacement total de la hanche par la prothèse de McKee-Farrar dans la polyarthrite rhumatoïde, la maladie de Still et la spondylite ankylosante

Chez les patients atteints de polyarthrite rhumatoïde, de la maladie de Still ou de la spondylite ankylosante, l'arthroplastie de remplacement de la hanche est considérée quand il y a une grande perte de mouvement accompagnée de changements osseux graves vus aux rayons X.

Un total de 66 articulations de la hanche affectées par la polyarthrite rhumatoïde, 15 par la maladie de Still, et 9 par la spondylite ankylosante a été opéré, ainsi que 90 articulations de la hanche atteintes d'ostéoarthrose. Ces malades ont été suivis pendant une période allant de 6 mois à 3 ans, et les résultats sont bons ou excellents dans plus de trois quarts des cas.

La complication la plus grave a été une infection profonde et un détachement de la cupule. On pense que cette dernière complication pourrait être empêchée le plus souvent par une disposition profonde de la cupule.

SUMARIO

Reemplazo total de la cadera usando la protesis McKee-Farrar en poliartritis reumatoide, enfermedad de Still y espondilitis anquilosante

En pacientes que padecen poliartritis reumatoide, enfermedad de Still o espondilitis anquilosante se contempla la substitución de la cadera por artroplastia cuando hay gran dificultad en el movimiento y dolor asociado con cambios radiológicos destructivos marcados. Se han practicado operaciones en un total de 66 caderas afectadas por poliartritis reumatoide, quince por enfermedad de Still y nueve por espondilitis anquilosante, junto con noventa afectadas por osteoartrosis. Después de la operación, estos pacientes han sido observados por periodos de entre 6 meses y 3 años, y los resultados son buenos o excelentes en más de tres cuartas partes de ellos.

Las complicaciones más graves han sido infección aguda y aflojamiento de la cúpula. Se considera que esta última complicación podría evitarse en gran medida, emplazando la cúpula a mayor profundidad.